Table to Determine the Degree of Polarization of Light refracted through Four Parallel Plates. By Prof. W. G. Adams.

If $\frac{p}{n+p}$ represent the proportion of polarized light in the refracted beam, then, employing the formulæ given in the *Philosophical Magazine* for March, we have

$$\frac{n+p}{p} = \frac{\frac{1}{\sin^2(\phi-\phi_1)} + \frac{7}{\sin^2(\phi+\phi_1)} - 4}{4}$$

where ϕ and ϕ_1 are the angles of incidence and refraction respectively.

For $\mu = 1{\cdot}5$ (crown glass), Angle of complete polarization 56° 18′ 36″
For $\mu = 1{\cdot}513$ Angle of complete polarization 56° 32′

From the results for these two values of μ the values for $\mu = 1{\cdot}54$ are deduced, and for any value of μ the degree of polarized light may readily be calculated from the formula. The values as given in the Paper referred to, are,—

ϕ	10°	15°	20°	21° 30′	25°	30°	35°	40°
$\frac{p}{n+p} =$	·0107	·02443	·04430	·05683	·07111	·10498	·14745	·19845
For $\mu = 1{\cdot}513$								
$\frac{p}{n+p} =$	·01103	·02504	·04540	(·05813)	·07267	·1076	·1509	·2029
Probable values for $\mu = 1{\cdot}54$								
$\frac{p}{n+p} =$	·0116	·0263	·0476	..	·076	·113	·158	·212

ϕ	45	50°	55°	56° 18′ 36″	60°	65°	70°	72°
$\frac{p}{n+p} =$	·25786	·32383	·39231	·40984	·4560	·50530	·5309	·53305
For $\mu = 1{\cdot}513$				(For 56° 32′)				
$\frac{p}{n+p} =$	·2635	·3305	·3999	·4204	·4642	·5139	·5394	(·5416)
Probably values for $\mu = 1{\cdot}54$								
$\frac{p}{n+p} =$	·275	·344	·415	..	·481	·531	·556	

From the table, for the values of $\frac{p}{n+p}$ we see that for four plates the proportion of polarized light in the beam which passes through the plate still goes on increasing when the incidence becomes greater than the angle for complete polarization, and that at about 72° it attains its greatest value, when there is about 53 per cent of the light polarized.

I have also formed a table for $\mu = 1 \cdot 513$, of which the results are given; and from these we can derive close approximate values for the proportions of polarized light for values of μ not differing much from these values.

The probable values for $\mu = 1 \cdot 54$ are given in the table.

If we employ the four plates as a depolarizer to determine the proportion of polarized light in the incident beam by reducing the light to its ordinary unpolarized state, then the proportion of polarized light in the incident beam will be given, for any angle of complete depolarization, by the value of $\frac{p}{n+p}$ for that angle.

Extract from a Report of the Eclipse Expedition of 1870, *at Augusta, Sicily.* By John Brett, Esq.

During the violent squalls of the night of the 21st, some heavy rain fell, and the morning of the Eclipse dawned badly. A sketch was made of the sunrise, which was red and threatening; but after daylight the sky partially cleared, and all the morning we remained in suspense, hoping perhaps, but dreading certainly.

Two members of our party were now detailed to Villa'smunda, and a Sapper, named Buchanan, was taught by Professor W. G. Adams to call the time in the observatory.

As the day advanced the sky rather improved, and the Sun's limb was fairly steady. The apparatus in my compartment of the observatory consisted chiefly of a reflecting telescope of silvered glass, $8\frac{1}{2}$ inches aperture and 7 feet focus, made by Mr. Browning, with an altitude and azimuth mounting of extraordinary steadiness. The defining power of this instrument is of first-rate excellence; and one side of the tube being entirely removed, no air-currents are generated in it by the Sun's heat, nor are any musical vibrations set up by the wind. Affixed close to the eye-tube was a card with a black disk on it for the purposes of drawing, and another for writing notes. The observations were commenced with a solar eye-piece, consisting of a first reflection prism, to which were applied alternately a Kellner with a field of 45′, power 75; a Kellner with field of 35′, power 100; and one of Mr. Browning's exquisite achromatic doublets, power 200; the two former supplied with dark glass, the latter with a sliding wedge. The first contact was beautifully seen and the exact time noted, the limb being fairly steady and the instrument perfectly so. Ten minutes later I suspected traces of a weak halo round the Sun, and at twenty minutes after first contact this had become more pronounced, presenting a tolerably well-defined boundary at a distance of about 2′ from the limb. I begged Mr. Burton, my next neighbour in the observatory, to bring his experienced eye to bear upon it, which he did. At the same time he called my attention to a tinge of redness towards the Sun's limb (on the disk), of the